

# Hydrology and Hydraulics

Hancock Bridge #3372

over

Hancock Stream

Embden, Maine

STP-2168(900)

WIN 021689.00



**Maine Department of Transportation  
Bridge Program**

## HYDROLOGY REPORT

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Flow data was prepared by the MaineDOT Environmental Office using the USGS Regression Equations (Hodgkins 1999 and Hodgkins/Lombard 2015). No other flow data was available. The bank-full width was measured by the MaineDOT Environmental Office at 28 feet.

### SUMMARY

Drainage Area	19.94	mi <sup>2</sup>
Q1.1	111.4	ft <sup>3</sup> /s
Q10	458.6	ft <sup>3</sup> /s
Q25	602.7	ft <sup>3</sup> /s
Q50	702.2	ft <sup>3</sup> /s
Q100	822.9	ft <sup>3</sup> /s
Q500	1108.1	ft <sup>3</sup> /s

Reported by: Joshua Hasbrouck  
Date: March 9, 2017

Note: All elevations based on North American Vertical Datum (NAVD) of 1988.

## HYDRAULIC REPORT

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### SUMMARY

		Existing Structure	Recommended Structure
		20' span concrete slab	26' span precast box culvert
Total Area of Waterway Opening	ft <sup>2</sup>	118.87	137.66
Headwater elevation @ Q <sub>1.1</sub>	ft	419.0	418.6
Headwater elevation @ Q <sub>10</sub>	ft	421.9	420.8
Headwater elevation @ Q <sub>25</sub>	ft	421.8	421.4
Headwater elevation @ Q <sub>50</sub>	ft	422.2	421.8
Headwater elevation @ Q <sub>100</sub>	ft	422.9	422.2
Headwater elevation @ Q <sub>500</sub>	ft	425.2	423.4
Freeboard @ Q <sub>50</sub> *	ft	2.8	1.2
Freeboard @ Q <sub>100</sub> *	ft	2.1	0.8
Outlet Velocity @ Q <sub>1.1</sub>	ft/s	4.4	4.4
Outlet Velocity @ Q <sub>10</sub>	ft/s	7.4	7.4
Outlet Velocity @ Q <sub>25</sub>	ft/s	8.1	8.1
Outlet Velocity @ Q <sub>50</sub>	ft/s	8.6	8.6
Outlet Velocity @ Q <sub>100</sub>	ft/s	9.2	9.2
Outlet Velocity @ Q <sub>500</sub>	ft/s	15.2	10.7

\* Freeboard reported for consistency across all options, but the design criteria for the culvert option would actually be HW/D ratio.

Reported by: Joshua Hasbrouck  
Date: August 3, 2017

Note: All elevations based on North American Vertical Datum (NAVD) of 1988.